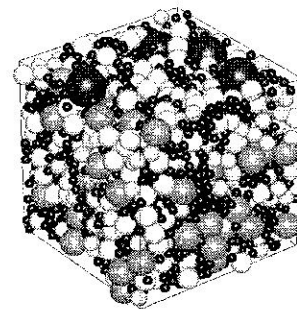


Density Practice Problems



The density of a substance is a measure of how much mass is packed into a certain volume of the substance. Substances with a high density, like steel, have molecules that are packed together tightly. Substances with a low density, like cork, have fewer molecules packed into the same amount of space.

The density of a substance can be found by dividing its mass by its volume. As long as a substance is homogeneous, the size or shape of the sample doesn't matter. The density will always be the same. This means that a steel paper clip has the same density as a steel girder used to build a bridge.

$$\text{Density} = \text{Mass} \div \text{Volume} \quad D = \frac{m}{V}$$

Use the density formula to solve the following problems. Show all work and the answer must have the correct units. Remember that volume can have different forms. A block of ice with a volume of 3 cm^3 would be 3 mL of liquid after being melted.

1. What is the density of CO gas if 0.196 g occupies a volume of 100 mL?

$$D = \frac{m}{V} \quad D = \frac{0.196 \text{ g}}{100 \text{ mL}}$$

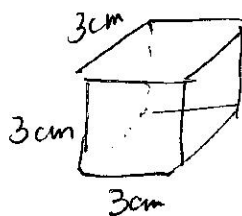
Answer 0.00196 g/mL

2. A block of wood 3 cm on each side has a mass of 27 g. What is the density of the block? (Hint, don't forget to find the volume of the wood.)

$$D = \frac{m}{V} = \frac{27 \text{ g}}{27 \text{ cm}^3}$$

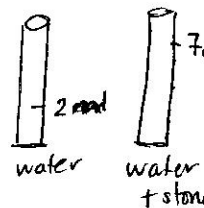
Answer 1 g/cm³

$$V = L \times W \times h = 3 \times 3 \times 3 = 27 \text{ cm}^3$$



3. An irregularly shaped stone was lowered into a graduated cylinder holding a volume of water equal to 2 ml. The height of the water rose to 7 ml. If the mass of the stone was 25 g, what was its density?

$$D = \frac{m}{V} = \frac{25g}{7-2g \text{ minus}} = \frac{25g}{5ml} = 5$$



4. A 10.0 cm³ sample of copper has a mass of 89.6 g. What is the density of copper? Answer 8.96 g/mL

$$D = \frac{m}{V} = \frac{89.6g}{10.0cm^3} =$$

Answer 8.96 g/cm³

5. Silver has a density of 10.5 grams/cm³ and gold has a density of 19.3 g/cm³. Which would have the greater mass, 5cm³ of silver or 5cm³ of gold?

Density of silver $\frac{10.5g}{cm^3}$ Density of Gold $19.3g/cm^3$

If volume is equal for both then Gold would be more mass.

Answer Gold

6. Five mL of ethanol has a mass of 3.9 g, and 5.0 mL of benzene has a mass of 44 g. Which liquid is denser?

$$\text{Ethanol} = \frac{3.9g}{5mL} = 0.78g/mL \quad \text{Benzene} = \frac{44g}{5mL} = 8.8g/mL$$

Answer Benzene

7. A sample of iron has the same dimensions of 2 cm x 3 cm x 2 cm. If the mass of this rectangular-shaped object is 94 g, what is the density of iron?

$$D = \frac{94g}{12cm^3} = 7.8$$

Answer 7.8 g/cm³